UW Medicine

ORCA

Online Record of Clinical Activity

ORCA Clinical Documentation Project Completeness and Closure Report

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Executive Summary

The ORCA Clinical Documentation Project Completeness and Closure Report serves as documentation that UW Medicine considers the project completed. At the time of publishing, final external labor actual expense is not yet available, but a projected final budget is provided within the report. This report is intended to address completeness and closure criteria with qualitative and quantitative evidence.

A summary table of the achievement of these criteria is presented below:

| Completeness and Closure Criteria	Achievement
Environment Stability	
Availability	Achieved
Application End-User Response Time	Achieved
Application Code Currency	Achieved
Technical Infrastructure Currency	Achieved
System Usage	Achieved
Application Stability for End-User	Achieved
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Project Closure and Completeness

Environment Stability

Availability

The production application has been available to end-users without major interruption or multiple minor interruptions outside of regular planned maintenance for a sustained period since initial implementation of Clinical Documentation at Harborview Medical Center (HMC).

Response: The graph below displays system availability over the past 15 months. The current annual availability is 99.82%. Note: An outage following the Clinical Documentation implementation at University of Washington Medical Center (UWMC) was a result of system middleware settings that had not been tuned to accommodate the increase in concurrent users. This outage is discussed further in the response to the Application End-User Response Time criteria.

ORCA System Availability

ORCA System Availability (Yearly)
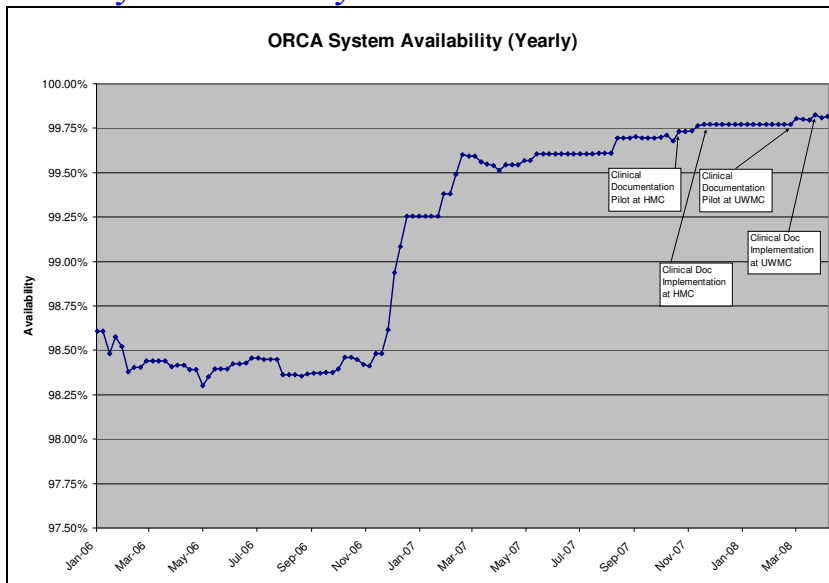
Application End-User Response Time

The production application response time is within acceptable limits for end-users and has not been significantly degraded with the introduction of Clinical Documentation functions.
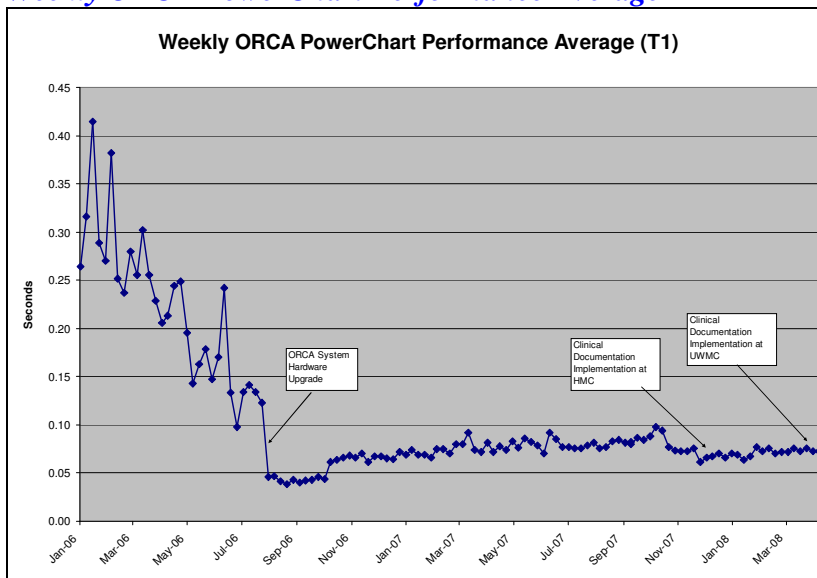
Response: Response time has been accepted by project business owners and sponsors, however the application support team and the application software vendor (Cerner) continue to seek improved response time through application tuning and application code, respectively. The graph below displays an average response timer data for the

ORCA application (PowerChart). Response time is represented by a system metric (T1). The graph indicates that the activities taken to mitigate the risk of degraded response time with the introduction of Clinical Documentation functionality were successful. The overall impact of Clinical Documentation on application response time was not systematically significant.

During the Command Center period supporting the UWMC implementation, application tuning was required to address periods of degraded performance. Tuning steps taken included the increase of instances of some processing services as well as the purging of temporary preference tables. The outage experienced on April 1 (noted in the response to the Availability criteria above) was also the result of inadequate service instance settings. The outage was resolved with an increase in the instance count. These exceptions were not identified during a vendor technical system review prior to the UWMC implementation. This is noted below in the Lessons Learned component of the Project Artifacts section of this report.

Weekly ORCA PowerChart Performance Average

Weekly ORCA PowerChart Performance Average (T1)

ORCA System Hardware Upgrade

Clinical Documentation Implementation at HMC

Clinical Documentation Implementation at UWMC

Application Code Currency

Cerner Millennium application code level in production is currently at a version supported by the vendor with code patches available. Production code level is at current or 'N-1' major version with plans in place to promote version updates.

Response: The current production application code level is the Millennium 2007 version with the .08 update (2007.08 code). The Millennium 2007 code version is the most current version. The .08 update is the July 2007 update and is actively supported by Cerner with code patches.

In March 2008, Cerner transitioned to quarterly updates from monthly updates. The UW Medicine ORCA team has plans to install either the first or second quarterly update to ensure continued currency on application code.

Technical Infrastructure Currency

The technical environment supporting the ORCA application is consistently maintained within support levels. Faults identified by technical and application vendors are resolved within timeframes accepted by system owner.

Response: ORCA technical guidelines with respect to both components of technical infrastructure currency are stated below:

Maintain Infrastructure within Supported Levels – Technical components will be maintained to be within vendor-supported levels. This guideline is dependent on Cerner to certify third-party components. The target is to be on newly certified component levels (where applicable) within 12 months of announced support, and conversely to be off de-certified component levels before support is discontinued.

Maintain Infrastructure to Include Resolution to Known Faults – As vendors identify known faults, the technical infrastructure will be updated (via patch and/or configuration) within 6 months of the fault identification. The time to resolve the exception is dependent on both the environment impact and the complexity of the resolution.

To support both components of technical infrastructure currency, the ORCA maintenance calendar reserves a quarterly downtime window for technical infrastructure maintenance.

System Usage

The increase in application usage can be demonstrated with data related to application log-ins, concurrent users, and data storage.

Response: The 3 graphs on the following pages demonstrate the increase in overall application use by clinical users.

Weekly ORCA PowerChart Users
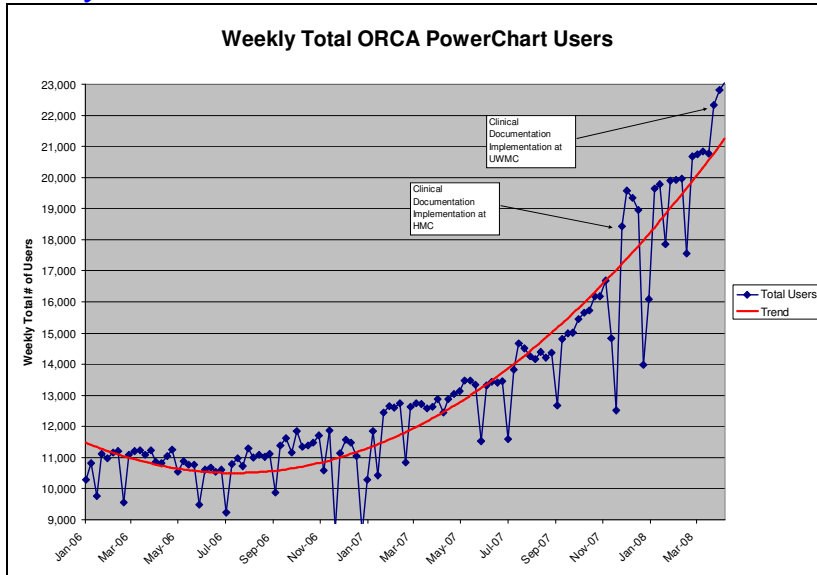
The Weekly PowerChart Users graph above indicates a steady increase of user sessions for the ORCA PowerChart EMR application.

Weekly Maximum Concurrent Users
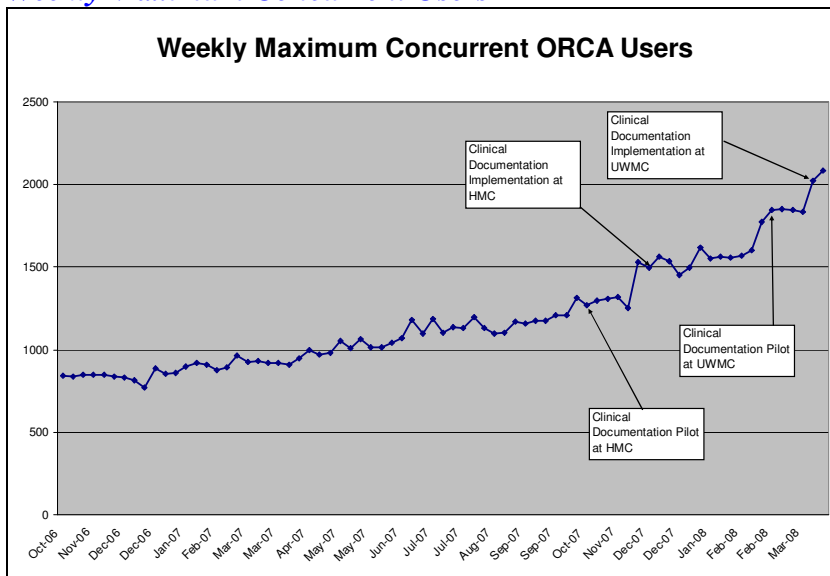
The Concurrent User graph above also indicates an increase attributable to the Clinical Documentation Project (~850 additional concurrent users).

ORCA Transactional Database Growth
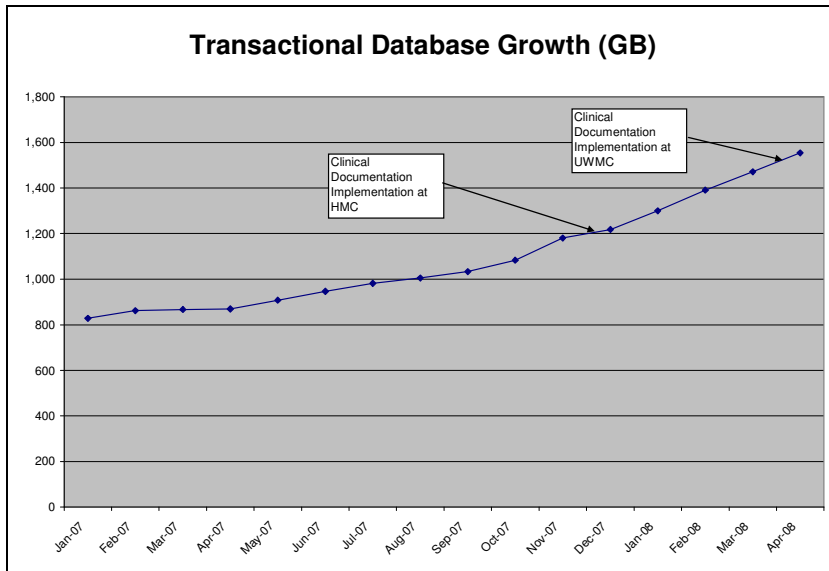
Transactional Database Growth (GB)

The ORCA Transactional Database Growth graph demonstrates the increase in storage requirements over the past 14 months. The primary reason for the change in growth rate since November 2007 is the Clinical Documentation Project.

System Capacity Adequacy

A capacity plan was completed and executed. The projected vs. actual utilization has been analyzed to serve as input for future capacity planning.

Response: The ORCA Hardware Upgrade implemented in July 2006 was a result of long-range capacity planning conducted in November 2005. Application sizing was conducted in September 2007 which resulted in addendums to the capacity plan in October 2007 and February 2008 to ensure adequate resource capability for the Clinical Documentation implementations. According to utilization projections, the current system capacity is adequate to support current and planned utilization for the next 18 months.

The graph on the following page compares the planned utilization with actual utilization over the past 8 months.

ORCA System Utilization vs. Capacity

ORCA System Utilization vs. Capacity

(chart: rPerf vs. months Sep-07 through Apr-08, showing Capacity, Projected Util., Actual Util. with annotations: CPU Added, Capacity Plan Addendum, HMC Implementation, Servers Added, UWMC Implementation)
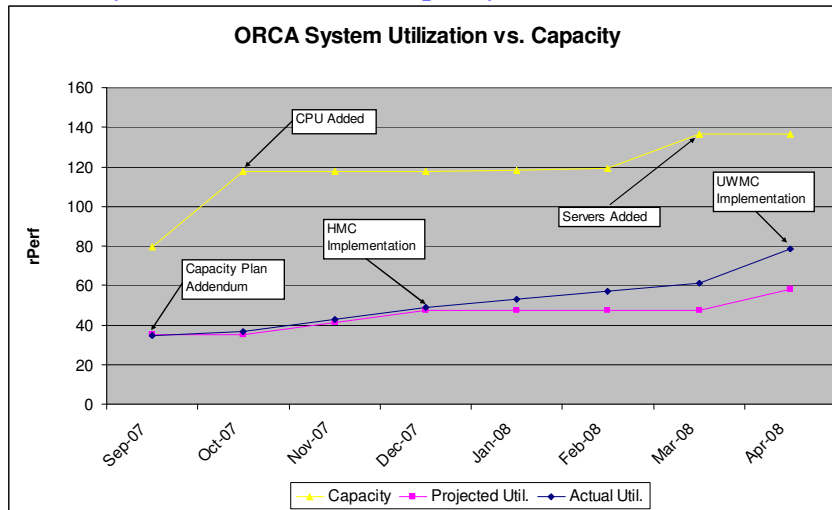
Evidence of the adequacy of the application sizing is presented in the graph below, which compares end-user system performance with concurrent user growth. Note that the significant growth in concurrent users has not affected end-user system performance metrics.

Concurrent User Count vs. Average End-User System Performance

Concurrent User Count vs. Avg End-User Performance

(chart: Max Concurrent Users and Average PowerChart Performance (T1 in seconds) vs. months Oct-06 through Mar-08, showing Max Concurrent ORCA Users and Avg Performance)
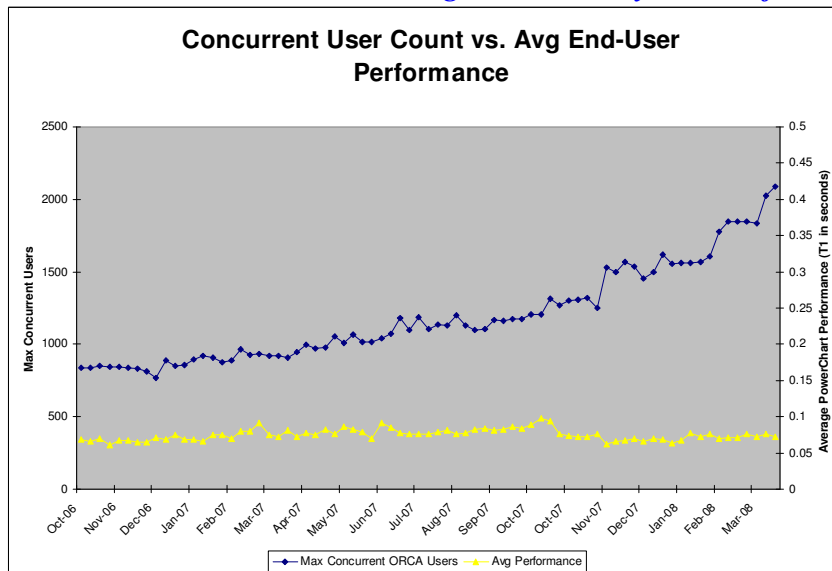
Application Stability for End-User

From the end-user's perspective, the application is stable. Provide evidence related to # of helpdesk calls or new issues opened.

Response: During the implementation at UWMC, a mechanism was put in place to allow UWMC users to bypass the Helpdesk and call directly to the Command Center. This temporary bypass will be in place until 4/22/08 while Clinical Analysts staff the Command Center to answer user questions. Call volumes to the Command Center are captured but have significant variability due to external factors such as variation in floor support and shift/expert user staffing.

An alternative application stability measure to call volumes is the number of issues opened by day. The 2 graphs below compare the volume of new issues opened during the first 16 days at HMC in November/December 2007 with the volume at UWMC in March/April 2008.

New Issues 1st 16 Days – HMC
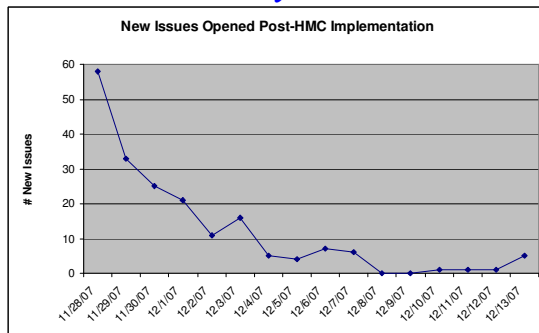
New Issues 1st 16 Days – UWMC
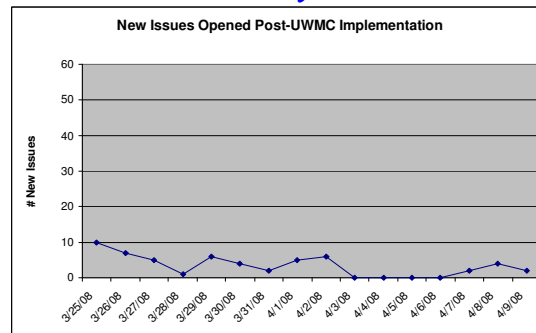
Achievement of Project Scope

Functional Application Scope

All components of the application solution that were included in the Project Charter (or changed via approved project change request) were successfully implemented and are currently in use by end-users.

Response: The following table represents the components of the functional scope as defined in the Project Charter. No project change requests were submitted to change functional scope of the project.

Functional Scope Statement (From Project Charter)	Solution Component	Business Acceptance
Patient History	Cerner Millennium PowerForm	Accepted
Admission Assessment	Cerner Millennium PowerForm	Accepted
Vital Signs and physiological assessments	Cerner Millennium iView	Accepted
Patient Safety and regulatory documentation requirements such as fall risk; use of restraints; assessments for further evaluation of nutritional, social services or spiritual care	Cerner Millennium PowerForm, tasks, Discern Expert rules	Accepted

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Functional Scope Statement (From Project Charter)	Solution Component	Business Acceptance
Intake and Output	Cerner Millennium IO2G and IO Review GenView	Accepted
Medication and medication drip documentation	Cerner Millennium eMAR and iView	Accepted
Ongoing assessments of all types including scale calculations for nursing, respiratory care, spiritual care, nutrition services, physical therapy, occupational therapy, speech therapy, nursing, students and any other service that are authorized to document in the inpatient care record	Cerner Millennium iView and PowerNote 2G	Accepted
Progress Notes	Cerner Millennium PowerNote 2G	Accepted
Pre-Op procedure checklist	Cerner Millennium PowerNote 2G	Accepted
PACU documentation	Cerner Millennium iView	Accepted
Procedure documentation	Cerner Millennium iView	Accepted
Treatment and equipment documentation	Cerner Millennium iView	Accepted
Limited stay and short stay documentation	Cerner Millennium iView	Accepted
Discharge planning documentation will be maintained on paper at first productive use.	Cerner Millennium PowerForm	Accepted
A transitional documentation tool to manage the plan of care prior to orders functionality being available.	Cerner Millennium PowerNote 2G and Patient Plan Summary GenView	Accepted
Any reports needed for Release of Information	PDS ROI Report and Patient Care Printing (Cerner CCL reports)	Accepted
Replacement of existing microbiology results display that is acceptable to physician staff. This work will be managed as a dependency outside of this project.	Cerner Millennium GenView	Accepted
Triggers generated from behind the scenes orders to alert non physician receiving services of the need for consultation	Cerner Millennium PowerForm, tasks, Discern Expert rules	Accepted
Capture for review and commitment to the record of data obtained from cardiovascular physiological monitors	Bedside Monitor Device Interface (BMDI)	Accepted
Graphing of selected elements of documentation and results	Cerner Millennium Advanced Graphing	Accepted
Creation of limited specialty views for review and documentation	Cerner Millennium iView	Accepted
Retrospective and real-time reports for quality improvement purposes	AIM-Replacement Reports (Cerner CCL reports) and Manatee (Custom-developed research reporting database)	Accepted
This project will align documentation designs at patient care transition points for ambulatory and the emergency department in order to support the continuum of care	Patient Care Printing (Cerner CCL reports)	Accepted

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Facility Scope

The application solution has been implemented and adopted in all patient care areas identified in the Project Charter (or per changes approved via Project Change Request).

Response: The following table represents the locations identified in the Project Charter as being included in the scope of the project. A single project change request was approved to modify the facility/location scope of the project. It is noted in the table.

Implementation Location (From Project Charter)	Date Implemented	Confirmed Use and Adoption
Harborview Medical Center (HMC)		
ICU Holding Unit	11/28/07	Confirmed
Post Anesthesia Care Unit (PACU)	11/27/07	Confirmed
Neurological ICU (NICU)	11/28/07	Confirmed
Medical ICU (MICU)	11/28/07	Confirmed
Trauma ICU (TICU)	11/28/07	Confirmed
Surgical ICU (SICU)	11/28/07	Confirmed
Burn ICU (BICU)	11/28/07	Confirmed
Pediatric ICU (PICU)	11/28/07	Confirmed
Cardiac ICU (CICU)	11/28/07	Confirmed
3E Medicine/Telemetry	11/28/07	Confirmed
3W Neurology	11/28/07	Confirmed
3W Epilepsy	11/28/07	Confirmed
4E Medicine/Geriatrics	11/28/07	Confirmed
4W Rehabilitation & Acute Overflow	11/28/07	Confirmed
5E Orthopedics	11/28/07	Confirmed
5WA Psychiatry	11/28/07	Confirmed
5WB Psychiatry	11/28/07	Confirmed
5EC Psychiatric ICU	11/28/07	Confirmed
6E AM admissions	11/28/07	Confirmed
6C LSU/Post Procedure/Short Stay	11/28/07	Confirmed
7E Trauma Surgery	10/23/07	Confirmed
8E Burn	11/28/07	Confirmed
Special procedure areas documentation in areas requiring sedation for procedures (e.g., MIPS, Gamma Knife, Interventional Radiology)	11/28/07	Confirmed
University of Washington Medical Center (UWMC)		
4NE General Surgery, Neurology, OTO, Urology	3/25/08	Confirmed
4SE Transplant, Renal, Vascular	3/25/08	Confirmed
4S Limited Stay, Special Procedures	3/25/08	Confirmed
5SE Cardiovascular Critical Care	3/25/08	Confirmed
5E Medical/Transplant ICU	3/25/08	Confirmed
5NE Cardiovascular Surgery, Cardiology	2/26/08	Confirmed
6SE Ortho, Ophthalmology	3/25/08	Confirmed
6NE Medicine	3/25/08	Confirmed
7N Medical Psychiatry	3/25/08	Confirmed
7SE Hematology/Oncology, Gynecology, Oncology, Urology	3/25/08	Confirmed
7NE HSCT Transplant (Oncology)	3/25/08	Confirmed
8NE SCCA HSCT, Oncology	3/25/08	Confirmed
8N Rehab	3/25/08	Confirmed

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Implementation Location (From Project Charter)	Date Implemented	Confirmed Use and Adoption
PACU	3/25/08	Confirmed
Pavilion Limited Stay	3/25/08	Confirmed
Pre-Operative Holding	3/25/08	Confirmed
Special procedure areas documentation in areas requiring sedation for procedures.	Not Implemented[1]	N/A

Training Scope

The end-users have received formal training appropriate to their role with documentation of the completion of training.

Response: Formal classroom training was provided for RN's, ancillary clinical staff and support staff. Classes were role-based and oriented to clinical workflow. RN classes were 8 hours in duration. Other classes were 4 hours and 2 hours in duration depending on the role of the end user.

The total number of users formally trained:
- *Harborview Medical Center – 1,597 end-users*
- *University of Washington Medical Center – 1,403 end-users*

Additional clinical ORCA end-users who review Clinical Documentation (medical staff and mid-level practitioners) were provided with informal training and job-aids. This level of training is not included in the numbers above.

Technology Scope

The technical environment was modified as necessary to provide an infrastructure to support the current and medium-range (9-12 months) Clinical Documentation solution requirements.

Response: Technical environment modifications to support the Clinical Documentation solution included solution-specific modifications as well as operational technical changes. These changes have been summarized in the table below.

Technical Environment Change	Change Description and Relationship to Clinical Documentation Solution
Bedside Monitor Device Interfaces (BMDI)	Clinical Documentation required 1-way interfaces from BMDI to ORCA in order that clinical data from bedside monitors default into the ORCA application. The interfaces were created in non-production and production domains for both medical centers.

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[1] A project change request was approved by project sponsorship and project leadership on February 1, 2008 to exclude from scope the special procedure areas requiring documentation of sedation at UWMC. The rationale for this change included multiple factors: physical space and device location, a recent turnover in operational leadership, and operational concerns related to the complexity of the medication process.

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Technical Environment Change	Change Description and Relationship to Clinical Documentation Solution
Cerner Millennium 2007.XX Application Code Version	An application code upgrade from 2005.02.XX to 2007.02 was required because of enhanced functionality to Intake & Output (I&O 2G) and PowerNotes (PowerNote 2G). The enhanced functionality was critical to Clinical Documentation solution design.
Cerner Millennium Application Code Update to 2007.08	The 2007.08 Cumulative Support Package (CSP) was required because it included a critical application performance correction for iView and I&O 2G application components.
Increased number of CPUs and memory to back-end application nodes	Increased the number of CPUs and memory in the (back-end) application nodes. These capacity increases were necessary because of increased users, new interfaces (bedside devices) and increased reporting needs.
Replaced database servers	The existing database servers were replaced by servers with faster clock speed, higher throughput and larger level 1 and level 2 cache sizes. The increases capacity was needed for the increased usage and the need to migrate operational reports from the existing CIS system.
Added more Citrix servers to support more capacity of concurrent users	Additional servers were added to support increased users.
Rebuilt Citrix server image	The server image was rebuilt on an operating system that supports addressing more memory (and therefore more users per server). The increased usage by Clinical Documentation without this per server increase, was projected to need more servers than our datacenters could easily support; thus, a new image was additionally needed to support the increased usage.
Added more Citrix licenses to support increased maximum concurrent users	Additional licenses were added to support maximum concurrent usage.
Training Environment Creation with Standby Environment	A new training system was developed on new hardware to support the high level of users needed to be trained in preparation for the Clinical Documentation deployments. Due to the high usage needs and the need to train 18 hours a day for 7 days a week, the training environment was built on a replicated platform capable of doing maintenance without downtime and higher reliability.
Created new queue types to support label printing	New queue types were designed to be able to print for a specific paper type and tray on a multifunction printer.
Added web proxy server	Added a new server to support running a web browser on the Citrix servers to point to web sites with reference data that is contextually relevant to the task they are performing.
Added memory to database nodes	Added more memory in the database nodes to support a larger memory based cache. This was an attempt to stay optimally configured for the Clinical Documentation deployment as risk mitigation against potential performance problems.

Technical Environment Change	Change Description and Relationship to Clinical Documentation Solution
Performed capacity assessment	Performed, with vendor, an application sizing exercise to baseline pre-Clinical Documentation load and estimate the need for additional capacity with the upcoming
Installed "Lights On" tools	Installed and configured the necessary infrastructure to report many new metrics including configuration compliance, response time measures, system crash counts, etc. As performance (response time) was a concern with the Clinical Documentation deployments, this tool provided an automated way of reporting this information and the ability to compare it to similar sites. Performance issues, can then, be triaged either to our configuration or the vendor based on comparisons to other sites.

Support Structure Definition

Operating Policies and Procedures and Position Descriptions

Applicable medical center and IT Services policies and procedures have been developed or modified as appropriate to the workflow changes introduced with the ORCA Clinical Documentation Project. Any medical center or IT Services position descriptions affected by the project have been modified appropriately.

Response: The Clinical Documentation project was primarily a replacement of a legacy system, so new or significant changes to medical center policies and procedures were not required. Some modifications to existing policies and procedures were necessary. Changes were made to the following:

- *ADT Interface Revised*
- *AM Admits to the Surgery Pavilion*
- *BMDI-Physiologic Monitoring Policy & Procedures*
- *Charge Nurse Role in Relation to ORCA*
- *Clinical Charting*
- *Downtime Policy and Procedures (UWMC and HMC PCIS Department Procedures)*
- *Encounter Selection Policy and Procedures*
- *ORCA Discharge Documentation*
- *ORCA Training*
- *Patient Flow in Surgery Pavilion*
- *Plan of Care*
- *Printing Patient Records and Reports*
- *Special Charting Procedures*
- *System Access and Security Policy*
- *UWMC Admit Macro Process Policy & Procedures*

IT Services Policy and Procedures were unaffected by the project implementation. The addition is incorporated in the Clinical Documentation Support Plan.

User and support roles in the Clinical Documentation application and process were not affected to the extent that changes to position descriptions were required.

Disaster Recovery and Business Continuity

The ORCA Program supports UW Medicine's business continuity plan with a disaster recovery plan and system toolkit to support continued clinical operations in the event of a system/component failure or for planned system outage.

Response: The medical centers have defined and approved system downtime procedures as part of their business continuity plan. These business continuity plans include downtime toolkits complete with detailed instructions and downtime forms. To ensure readiness, regular drills are conducted within the medical centers. The medical centers' business continuity plans are supported by ORCA system components. These components include:

- *Read-Only Stand-by System – A read-only version of the production system can be made available to the end-user community within 1-hour of a primary system failure or at the start of a planned maintenance.*
- *Offline Clinical Data Components – Defined data sets are stored in offline components. These data sets are made available in the event of a downtime. These solutions include*
  - *Medication administration records (MAR's) that are stored locally, printed on a local printer, and distributed to appropriate clinical areas in the event of a downtime.*
  - *Cerner Millennium PowerChart Local Access (PCLA) is a Cerner product that downloads clinical data to local workstations throughout the medical centers. It is used to provide data access in the event of a network outage.*
- *Patient Information Management Entry – In the event of a downtime in the upstream patient management systems, downtime procedures call for direct entry of basic patient information into ORCA. This provides patient/encounter records into which clinical data may be entered. These records are later merged with interfaced records following recovery of the upstream systems.*

The disaster recovery solution for ORCA utilizes Cerner's Disaster Recovery toolkit. The primary component is a stand-by database/system located in a physically separate offsite data center. The database is updated real-time from the primary system. The stand-by system is capable of supporting the production load in a read-write mode. An additional component in the ORCA disaster recovery plan is the storage of back-up tapes in an offsite facility. Full daily database back-ups are supplemented by daily incremental back-ups. Tapes are delivered on a daily basis to the storage facility.

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Appropriate Support Staffing

The recently implemented Clinical Documentation functionality has adequate staffing assigned to support and maintain the system to meet service levels.

Response: Support of the ORCA Clinical Documentation application components has been absorbed by existing application support teams. Impact of this support role on each group is described below:

- *Harborview Medical Center Patient Care Information Systems Team (HMC PCIS) – Prior to the ORCA Clinical Documentation Project, this team supported all aspects of the legacy clinical documentation system ranging from end-user education to application and system administration. During the project, PCIS team members served as clinical analysts, trainers and report programmers on the project team. With the replacement of the legacy system, the support team has transitioned to supporting ORCA, though application and system administration responsibilities were transitioned to teams in UW Medicine IT Services. To account for an increase in the support due to Clinical Documentation and other aspects of the ORCA Project, the team has been increased by 3.0 FTE since project initiation in July 2006.*
- *University of Washington Medical Center Patient Care Information Systems Team (UWMC PCIS) – Similar to HMC PCIS, the UWMC PCIS support team has transitioned to supporting ORCA. To account for an increase in the support due to Clinical Documentation and other aspects of the ORCA Project, the team has been increased by 4.8 FTE since project initiation in July 2006.*
- *UW Medicine IT Services Clinical Application Support Team (CAS) – During the Clinical Documentation Project, 3.0 FTE from the CAS Team were dedicated to the project. To accommodate this resource assignment and ensure appropriate support staffing levels following the implementation, the CAS Team was supplemented with 2.0 FTE.*
- *UW Medicine IT Services ORCA Technical Services Organization (ORCA TSO) – Staffing of the Technical Services Organization to support ORCA has been increased to meet the increased support requirements for operations and projects. Within the past year, the team has added 3 positions: Technical Project Manager, System Administrator, and Database Administrator.*

Supporting Governance

Governance has been established to guide the refinement of the implemented Clinical Documentation solution.

Response: The governance for guiding ORCA Clinical Documentation system refinements and prioritizing corrections and enhancements is defined in the ORCA Support Plan. System change management and environment management are defined in the ORCA Change Control Policy and ORCA Domain Management Policy, respectively.

A brief description of the ORCA Clinical Documentation governance:

- *Joint ORCA Patient Care Services Leadership Committee – Serving as the project steering committee during project execution, this committee continues to serve as the steering committee for the Clinical Documentation component of the production ORCA system. Made up of the Chief Nursing Officers and Patient Care Services directors from both Harborview Medical Center and University of Washington Medical Center, the committee is responsible for guiding the clinical adoption of the system and clinical transformation for which the system serves as a major tool.*
- *Joint Patient Care Documentation Team – This team is comprised of clinical analysts from both medical centers and application analysts who served as project team members during the project execution. The Patient Care Documentation Team is responsible for ensuring the alignment of the application solution with clinical workflow and policies & procedures at both HMC. The team is also responsible for evaluating and prioritizing application enhancement requests and issues/defects.*
- *Existing Committees and Governance at HMC and UWMC – Many aspects of clinical care and documentation are governed by standing committees or operational governance within each medical center. These venues will continue to serve a role in determining use and direction of ORCA Clinical Documentation. Examples include the Medication Administration Committee and the Organizational Improvement Program.*

Production Support Acceptance

Responsibility for the system support of the Clinical Documentation solution has been accepted by the ORCA support organization and transitioned from the ORCA project management organization.

Response: The formal transition of responsibility is documented in the ORCA Clinical Documentation Support Turnover Acceptance document. This ORCA standard document includes reviews of the ORCA Support Plan as well as reviews of unresolved issues and enhancement requests. The support acceptance document will be signed by appropriate project and support stakeholders on April 21, 2008.

Project Benefits

Project expected benefits were defined and clearly documented. Achievement of the benefits has also been documented.

Response: Planned benefits for the ORCA Clinical Documentation Project have been defined and published. The metrics have not yet been measured, but will be documented following a system stabilization period. The metrics to be assessed after the stabilization period are listed below:
- *Through the use of triggers, improve time to intervention by non-physician consult services such as nutrition by 10%*

- *Increase rate of skin assessment and re-assessment by 15% to support the prevention and surveillance of skin breakdown*
- *Improve regulatory compliance with restraint reassessment at 24 hours and/or before discharge by 10%*
- *With implementation of the electronic medication administration record, decrease discrepancy between RN and Pharmacy medication profiles to 0%*
- *With implementation of the electronic medication administration record, decrease errors caused by omitted doses by 10%*

Project Artifacts

Project Lessons Learned

A process has been completed to extract lessons learned from the project that can be applied to future projects.

Response: An extensive process to collect lessons learned at multiple levels from project team members and project stakeholders is currently underway. The high-level lessons learned (identified below) were compiled from solicitation of the Clinical Documentation Project steering committee, project leadership and overall ORCA Program leadership.

High-Level Lessons Learned
   Success Factors
- *Executive Sponsorship Priority – The overall ORCA executive sponsor, Dr. James Fine, UW Medicine Chief Information Officer, established the ORCA Clinical Documentation Project as the highest priority IT project in the entire organization. This priority ensured that every required resource was available to the project and that contention with other activities was minimized.*
- *Operational Executive Sponsorship/Steering Committee Commitment and Business Objective Clarity – The project's executive sponsors and steering committee established clear business objectives during the initiation and planning phase and they remained focused on these throughout the duration of the project. They ensured that the Clinical Documentation project was appropriately prioritized within the operations of their respective clinical organizations. Additionally, the sponsors and steering committee fully supported the project leadership's adoption of formal project methodology.*
- *Adherence to Formal Project Management Methodology – The structured approach and disciplined execution of the project were major factors in the success of the ORCA Clinical Documentation Project. The project leadership's commitment to the framework and project management toolkit established an effective environment in which to execute the project.*
- *Limited Dependence on Future Functionality – The application software vendor continues to aggressively enhance the product with functionality that better supports many aspects of clinical workflow. Clinical Documentation Project leadership resisted the urge to incorporate these future enhancements*

as project dependencies except in 2 critical cases that were identified in the early stages of the project.

- *Vendor Contract with Milestone-Based Payments – The Cerner contract amendment for the Clinical Documentation Project established payment conditions that were dependent on achieved major project milestones. This structure aligned the incentives for UW Medicine and Cerner Corporation and resulted in appropriate access to Cerner engineering, product expert and field staff.*
- *Prioritization of Infrastructure – Prior to initiating the ORCA Clinical Documentation Project, the ORCA Executive Sponsor established a stabilization phase of the overall ORCA Project. The objective of this phase was to ensure that the Clinical Documentation project was implemented into a technical and application environment that was capable of supporting it. The phase included upgrades of hardware, database and application software as well as the establishment of appropriate support and project processes.*

Opportunities for Improvement

- *Approach to Account for Functionality-Dependent Design – In many cases, detailed product features and functions were not fully understood by the project team until the team was configuring the solution during the build phase. In cases where the solution design was based on an incorrect assumption of the functionality, the design had to be revisited. In future projects, the approach will be modified to account for such situations.*
- *Greater Contract Specificity in Vendor Deliverables – While a major factor in the success of the project, the Cerner contract amendment was not specific enough in detailing expected deliverables from Cerner. Future contracts will detail expected deliverables (with delivery dates) to include formal system tuning guidelines, technical readiness reports, and documented formal design and build recommendations, where appropriate.*
- *Formal Business Ownership of Project Benefits – The project team did not include a role with responsibility for defining, establishing a baseline and designing a tracking process for project benefits. Future projects will formally engage the appropriate quality improvement organization to assume ownership of this component. Project roles will be defined to support the quality improvement organization during the planning and execution of the project.*
- *Modifications to Project Staffing Plan/Labor Budget – While the initial overall labor effort estimate was accurate, the staffing plan did not incorporate significant spikes in staffing to accommodate labor intensive implementation support. Future projects will incorporate these efforts using the Clinical Documentation implementation actual effort as a benchmark. Additionally, future project budgets will earmark external labor contingency*

to supplement internal labor and fill gaps created by staff attrition, if required.

Tactical Lessons Learned
Tactical lessons have been solicited from project team members and stakeholders from IT Services, HMC and UWMC. 2 forums were provided for input:

- *Facilitated Session –The 2 ½ hour session was facilitated by a trained mediator from UWMC's Organizational Development and Training department. The session excluded managers and supervisors to provide staff with an environment that supported open input.*
- *Online Survey – An online survey was provided to team members and stakeholders for additional input.*

These lessons learned will be finalized and documented in a post-implementation review report. They will then be uploaded into a Lessons Learned database for future queries. One of the steps in the standard project planning phase is for the project planning team to review the Lessons Learned database to ensure that prior lessons are incorporated in the project.

Project Progress

Project actual progress was tracked against the planned progress and reported to sponsors and stakeholders throughout the duration of the project.

Response: The Clinical Documentation Project progress was reported monthly to project sponsors and UW Medicine leadership. Progress was reported in terms of earned value compared to planned value in the graph below. Note: April 2008 month-end process has not yet been completed, therefore April actual effort has not been included in the graph.

Clinical Documentation Project Progress
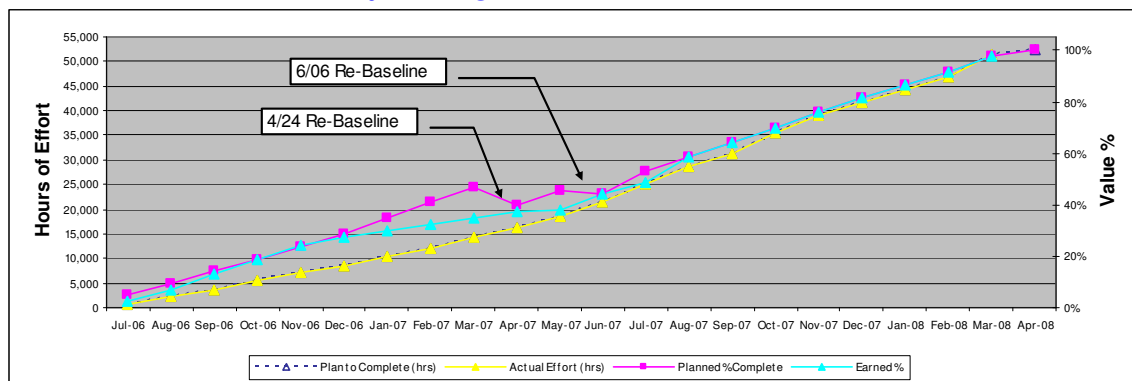
Project Change Requests

Project controls were utilized to manage changes in scope, expense, and timeline throughout the lifecycle of the project.

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Response: Standard ORCA project change control policy was utilized for the Clinical Documentation Project. Requested project changes were approved by ORCA Project Director, Clinical Documentation Project Business Owner, ORCA Program Director, and Executive Sponsors, if appropriate. The table below represents the approved changes:

Approved Clinical Documentation Project Changes[2]

#	Approved Change Description	Date Approved	Impact
1.	Project start date changed from 7/1/06 to 8/1/06 to accommodate ISB approval and Cerner resource availability.	8/1/06	Resulted in delay to Design Complete milestone by 3 weeks. See Change #3.
2.	Increase in physician analyst time from 0.2 FTE to 0.6 FTE to fill gap of an un-staffed project analyst position.	8/15/06	Decrease in favorable variance by ~$3,500/month.
3.	Change in Design Complete interim milestone date from 9/30/06 to 10/20/06.	10/2/06	Added risk to a future timeline impact. This risk was realized later ultimately resulted in Change Request #5 below.
4.	Decrease in physician analyst time from 0.6 to 0.2 FTE due to contention for resource and availability of project analyst to fill previously un-staffed role.	11/27/06	Return to planned spend rate.
5.	Change in project schedule (with related budget change) to shift interim milestones and deployment milestones by 4 weeks for HMC and 6 weeks for UWMC. This change included a corresponding re-baseline.	4/17/07	4 and 6 week delays for HMC and UWMC implementations. Increase in expected cost by ~$230,000. ($187,000 Internal Labor, $43,000 External Labor)
6.	Change in project budget to account for contractors not included in original budget: 1 analyst for 16 weeks, training manager for 18 weeks, 1 project manager for 9 months.	4/18/07	Increase in expected cost by $305,000.
7.	Change in testing approach to remove 3rd test cycle and replace it with exception testing to keep the deployment milestone dates.	5/23/07	Added risk of reduced remediation time for identified issues.
8.	Change in testing approach to re-define planned validation test as Test Cycle 3. Validation test was originally planned to be a regression test after build-out in the secondary production certification domain. This change extended the Test Phase by 4 weeks because validation test was originally part of the Deployment Phase. This change included a corresponding re-baseline.	6/6/07	Expended schedule slack and compressed training timeline, increasing risk that training content did not include final design.

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[2]Milestones affected by changes were internal project target milestones.

#	Approved Change Description	Date Approved	Impact
9.	Change in facility/location scope to exclude special procedure areas requiring sedation due to: • Physical space and device location • A recent turnover in operational leadership • Operational concerns related to the complexity of the medication process.	2/1/08	No impact to project cost or schedule. Areas added to schedule for future operational deployment.

Project Performance

Describe project performance in terms of schedule, effort and budget metrics.

Response: The performance metrics are presented below along with variance explanation. Note: Planned budget/effort and duration refers to internal project targets.

Project Duration

Original Baseline Duration	*629 days*
Actual Duration	*633 days*
Actual over Baseline	*4 days*

Variance Explanation

> *The implementations and closeout were completed ~1 month later than originally scheduled, however the project began 1 month later than scheduled due to ISB approval and vendor resource availability.*

Project Effort[3]

	Original Estimated Effort	Actual Effort	Variance
Internal Labor	*45,444 hrs*	*48,682 hrs*	*3,238 hrs*
External Labor	*0 hrs*	*3,851 hrs*	*3,851 hrs*
Total Effort	*45,444 hrs*	*52,533 hrs*	*7,089 hrs*
Variance %			*15.6%*

Variance Explanation

> *The variance in project effort was due to 2 factors:*
> - *Effort to develop education materials and curriculum was significantly underestimated (53% of variance)*
> - *Effort required to support the implementations at both medical centers was significantly underestimated (47% of variance)*
>
> *The original estimated effort identified above did not include contingency. Contingency was included in the Project Budget below.*

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[3] April 2008 actual effort has been projected in the calculations.

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Project Budget[4]	Budget	Actual	Variance
Capital Expenditures			
Hardware Purchases	$14,745	$11,797	$(2,948)
Software Licenses	$870,400	$870,400	-
Internal Labor	$3,377,218	$841,241	$(2,535,977)
Cerner Consulting Labor & Travel	$4,707,723	$5,042,994	$335,271
Other Consulting Labor & Travel	-	$485,312	$485,312
Cabling & Remodeling Exp.	-	-	-
Total Capital Expenditures	**$8,970,086**	**$7,251,744**	**($1,718,342)**
Operating Expenditures			
Hardware/Hardware Maintenance	-	-	-
Software Maintenance	-	-	-
Internal Labor & Travel	$936,725	$1,487,084	$550,359
Cerner Consulting Labor & Travel	-	$384,761	$384,761
Other Consulting Labor & Travel	-	-	-
Sierra Systems Audit Fees	$100,000	-	$(100,000)
Data Center Lease Expenses	-	-	-
Training Expenses	-	-	-
Other Expenses		$2,504	$2,504
Total Operating Expenditures	**$1,036,725**	**$1,874,349**	**$837,624**
Grand Total Expenditures	**$10,006,811**	**$9,126,093**	**$(880,718)**
Variance %			*-8.80%*

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[4] The project budget displayed here is not final but based on estimates for March and April external labor.